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A METHOD FOR REARING THE SAND COCKROACH, *ARENIVAGA TONKOWA* (DICTYOPTERA: POLYPHAGIDAE)

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Abstract.—A simple method is described for the laboratory culture of the sand cockroach *Arenivaga tonkowa* Hebard. By use of this method the colony is increasing in size and has successfully passed through three generations in the laboratory.

Insects which have adapted to life in very dry environments represent a physiologically and ecologically important group of animals. Cockroaches of the genus *Arenivaga* fall in this category, and have been used in such studies (Cochran, 1976; Edney, 1966; 1968; Friauf and Edney, 1969). As with any group of animals the ability to establish and maintain a laboratory colony of these insects greatly facilitates their use as experimental animals. Past experience in my laboratory has shown that attempts to rear one member of this genus (*A. investigata* Friauf and Edney) by methods used for other cockroach species have uniformly resulted in the expiration of the colony within a few weeks. The purpose of this paper is to describe a method which has been developed for the continuous laboratory culture of *A. tonkowa* Hebard.

MATERIALS AND METHODS

The cockroaches used in this study were collected from very dry soil along the banks of the Guadalupe River north of San Antonio, Texas in July of 1977 and 1978. They were transported to the laboratory and placed in culture. The original collections numbered about 25 in 1977 and 15 in 1978.

The culture method is based upon an observation made at the collection site in 1977. The cockroaches were living in the soil under an abandoned metal drum. This appeared to be a more or less closed system with little exposure to light. To simulate these conditions a one gallon cardboard ice cream container with closely fitting lid was used as the rearing cage. Into it was placed dry sandy soil to a depth of 3–5 cm. The unsterilized soil was previously passed through a #7 USA Standard Testing Sieve in order to

remove extraneous materials. Onto the surface of the soil was placed a circular watch glass 5 cm in diameter with its concave side up. This served as the receptacle for the watering device and prevented capillary action by the soil, which otherwise would have rapidly drained the water reservoir.

The watering device was a 2 dram shell vial with lip. After filling the vial with water, its open end was closed with a piece of wet sponge cut to give a tight fit. The sponge was box shaped and measured about 4 × 2.5 × 2.5 cm. When properly in place, it allowed slow withdrawal of water from the vial. The vial was laid flat on the soil surface with the wet sponge end on the watch glass. The reservoir was replenished at approximately weekly intervals, while the sponge had to be replaced periodically.

Food was supplied to the cage in the form of commercial dog food. One or two pellets were placed on the soil surface well removed from the source of water. Rearing was conducted in a room with the temperature controlled between 21–26° C at ambient relative humidity. The light intensity in the cages was very low except when the lid was removed for servicing.

Results

The cockroaches were placed on the surface of the soil and immediately began burrowing into it. Within a few seconds they were completely out of sight. This appears to be their normal pattern, except for adult males and small nymphs which occasionally were found on the surface of the soil at times of servicing the cages. Additionally, when the cages were opened for servicing the cockroaches sometimes emerged from the soil and began climbing the cage walls. This is probably a positive phototropic response to a suddenly increased light intensity. Presumably, such a situation would not normally occur in the natural habitat.

Under the rearing conditions described here the colony was stabilized. Within a few weeks adults were in evidence, and oothecae were subsequently found in the soil. While detailed life-history studies have not yet been conducted, this species went from adult to adult in about 5 months. The colony has now passed through 3 generations in the laboratory, and currently numbers about 100 individuals.

Discussion

The method described here has proven successful for the laboratory culture of *A. tonkowa*. It appears that it should also be adaptable to the culture of other members of this genus. Where possible, it would seem desirable to use soil collected from the natural habitat.

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